Philosophical Transactions

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An Account of a Book.

Several TRACTS written by the Honourable Robert Boyle; *of the ſtrange Subtilty, Efficacy, and determinate Nature of EFFLVVIVM'S; of New experiments to make the parts of FIRE and FLAME Stable and Ponderable; together with ſome Additional Experiments about Arreſting and Weighing of Igneous corpuſcles; as alſo a Diſcovery of the Perviouſneſs of Glaſs to Ponderable parts of Flame, with ſome Reflexions on it by way of Corollary.*

How important theſe *New Tracts* are to natural Philoſophy, the Conſidering Reader will ſoon find upon an attentive peruſal of them.

In the *Firſt* of which, touching *Effluviums*, he will meet,

Firſt, with divers Experiments and Obſervations, proving their wonderful *Subtilty*, and referible to one of the following Heads :*viz. The* ſtrange Extenſibility of ſome Bodies whilſt their parts yet remain tangible: *The* multitude of viſible corpuſcles that may be afforded by a ſmall portion of matter: *The* ſmalneſs of the Pores at which the *Effluvia* of ſome Bodies will get in: *The* ſmall decrement of Bulk or Weight, that a Body may ſuffer by parting with great ſtore of Effluvia: *The* great quantity of ſpace that may be filled, as to ſenſe, by a ſmall quantity of matter when rarifyed or diſperſed.

Secondly, with ſeveral Conſiderations, evincing the great *Efficacy* of Effluviums, notably operating upon one another, by at leaſt *ſix* wayes: 1. By the *Great Number* of emitted corpuſcles. 2. By their *penetrating* and pervading nature. 3. By their *Celerity*, and other modification of their Motion. 4. By the *Congruity* and *Incongruity* of their Bulk and Shape to the Pores of the Bodies they are to act upon. 5. By the *Motions* of *one* part *upon another*, that they excite or occaſion in the Body they work upon according to its ſtructure. 6. By the Fitneſs and Power they have to make themſelves to be *aſſiſted* in their working by the *more Catholick Agents* of the Univerſe.

Thirdly, with particular Inſtances of the *Determinate nature* of Effluviums, reduced to three Heads. 1. That theſe *Effluvia* being by Condenſation or otherwiſe re-united, they appear to be of *the ſame* nature with the Body that emitted them. 2. We may diſcover their Determinate nature by the difference that may ſometimes be obſerv'd in their Senſible Qualities; foraſmuch as thoſe *Effluvia* that are endowed with them, proceed from the ſame ſort of Bodies, and yet thoſe afforded by one kind of bodies, being in many caſes manifeſtly differing from thoſe that fly off from another, this evident diſparity in their exhalations argues their retaining diſtinct natures, according to thoſe of the reſpective Bodirs whence they proceed. 3. We may diſcover this Determinate nature of Effluviums from their Effects upon other Bodies than the Organs of our Senſes; conſidering, that the Effects which certain Bodies produce on others by their Effluviums, being conſtant and determinate, and oftentimes very indifferent from thoſe, which other Agents by their Emiſſions work upon the ſame and other ſubjects, the diſtinct nature of the Corpuſcles emitted may be thence ſufficiently gathered. The inſtances produced to make out this particular, are concluded with an Experiment ſhewing to the very Eye, That *Effluvia* elevated without the help of Heat, and wandring in the Air, may *both* retain their own nature, *and* upon Determinate Bodies produce effects, that a vulgar Philoſopher would aſcribe to *Occult* Qualities.

In the *ſecond* Tract, containing *New Experiments to make the Parts of Fire and Flame Stable and ponderable*, the Noble author himſelf acquaints us with the Motive, Deſign, and Parts thereof. He conſider'd then, that there being a very vaſt diſproportion between the Diaphanous part of the World, and the Globes ſwimming therein; and the nature of Diaphanous bodies being ſuch, that when the Sun or any other Luminous Body illuſtrates them, the Light does ſo penetrate and mix it ſelf *per minima* with them, that there is no ſenſible part of the tranſparent Body un-inlighten'd; it would be worth the enquiry, Whether a thing ſo vaſtly diffuſed as *Light* is, were ſomething Corporeal or not; and

and whether, in caſe it be, it might be ſubjected to ſome other of our Senſes beſides our *Sight*, whereby we might examine, whether it had any affinity with other Corporeal Beings that we are acquainted with here below?

He further taking notice of the Diſputes between the *Peripateticks*, *Carteſians*, and *Atomiſts* of old, concerning the nature of Light, whether it be a meer Quality, or a Modification of Motion in an Æthereal matter, or a Corporeal ſubſtance; and doubting, Whether the Corporeity of Light would be in haſt determin'd by meer *Ratiocinations*: He thought it very well worth the endeavouring to try, Whether he could do any thing towards clearing the diſpute of it by *Experiments*; eſpecially being perſwaded, that, if ſuch an attempt ſhould prove ſucceſsful, the conſequences of it would be very great and uſeful towards the explicating of divers *Phænomena* in divers parts of Natural Philoſophy, as in *Chymiſtry*, *Botanicks*, and, (if there be any ſuch) the allowable part of *Aſtrology*.

Now to compaſs what he aimed at, he intended *firſt* to try, what he could do by the *Union of Sun-beams*; and then, what could be obtain'd from *Flame*. But having been hitherto diſappointed by the cold and wet weather from proſecuting his attempts with the *Sun beams*, ſo far at leaſt as to build on them as yet, and therefore reſerving an account of them for another opportunity; he recites in this Eſſay that ſort of Experiments, which depending leſs on Caſualties, 'twas more in his power to bring to an iſſue, *viz.* thoſe made with *Flame*; of which he hath delivered a good number, willing to contribute ſomething towards the Hiſtory, that now perhaps will be thought fit to be made of the Increaſe or Decrement, that particular Bodies may receive by being expoſed to the Fire; conſidering alſo, that the Incongruity of the Doctrine here aſſerted to the Opinions of the Schools, and the general Prepoſſeſſions of Mankind, made it fit by a conſiderable variety and number of Experiments to obviate, as far as might be, the differing Objections and Evaſions, wherewith a Truth ſo paradoxical may expect to be excountred. Certain it is, that this Diſcovery cannot but excite the Inquiſitive to exerciſe their ſagacity in finding out, what kind of ſubſtance that is, which, though hitherto overſeen, and being a Fluid far more ſubtile than viſible Liquors, and able to pierce into the Compact and Solid bodies of Metals, can yet add ſomething to them, that has no deſpicable weight upon the Ballance, and is able for a conſiderable time to continue fixt in the Fire.

This part is follow'd by ſome *Additional Experiments* about *Arreſting* and *Weighing of Igneous Corpuſcles*; which ſince they ſhew, that what is afforded by Fire may in a corporeal way invade, adhere, and add Weight to even fixt and ponderous Bodies, do thereby open a large field to the Speculative to apply this diſcovery to divers *Phœnomena* of Nature and Chymiſtry.

After this he proceeds to another Diſcovery, which is of the *Perviouſneſs of Glaſs to Ponderable Parts of Flame*. And here, that he might not only obviate ſome ſcruples that may be entertain'd by ſuſpitious Wits upon that Circumſtance of the preceding Additional Experiments, viz. *That the Glaſſes employed about them were not expoſed to the action of meer Flame, but were held upon Charcoals*; which may ſeem to contain but a groſſer kind of Fire; but alſo that by diverſifying the way of tryal, he might render ſuch Experiments *both* more fit to afford Corollaries, *and* more ſerviceable to his other purpoſes; He attempted to make it ſucceed with a Body ſo thin and diſengaged from groſs matter, as meer Flame is allow'd to be, knowing, that by going cautiouſly with it to work, one might handle a Retort without breaking it, in ſpite of a violent agitation of kindled matter.

Mean time, by the Experiments here recited concerning this argument, the Author pretends not to make out the *Poroſity of Glaſs* any further, than is expreſt in the Title of this Diſcours, namely, in reference to ſome of the *Ponderable Parts of Flame*. For he thinks not Glaſs to be eaſily penetrable *either* by Chymical Liquors, *or* by Quickſilver, *or* at leaſt by our Air. Again, having compared the increaſe, he obſerv'd to be made in the Weight of the Bodies expoſed by him to the naked Fire, and thoſe of the ſame or the like kind, included by him in Glaſſes, or ſo much as in Crucibles; he eſteems it worth conſidering, Whether this difference in acquired Weight may not

not give cauſe to ſuſpect, that the Corpuſcles, whereof Fire and Flame conſiſts, are not all of the ſame ſize, and equally agitated, but that the interpoſed veſſel keeps out the groſſer particles like a ſtrainer, though it lets paſs the minuteſt and moſt active? He further offers it to conſideration, Whether the Perviouſneſs of Glaſs, even to the minute particles that pervade it, and their adheſion to the metal they work on, does neceſſarily imply Pores *conſtantly* great enough to tranſmit ſuch Corpuſcles? *Or*, Whether it may not be ſaid, *that* Glaſs is generally of a cloſer texture, than when in his Experiments the Pores are opened by the vehement heat of the Flame that beats upon it, and in that State may let paſs corpuſcles, too big to permeate Glaſs in its ordinary State; and *that* this penetration is much aſſiſted by the vehement agitation of the igneous parts, which by the rapidneſs of their motion both force themſelves a paſſage through the narrow Pores of the glaſs, and pierce deep enough into thoſe of the included body to ſtick faſt there.

But by all theſe Experiments the Author profeſſes himſelf not to be ſo far ſatisfied, as *either* to determine, whether the rectitude, by ſome ſuppoſed in the Pores of Glaſs as 'tis a tranſparent body, or rather in their ranks or rows, may facilitate the Perviouſneſs by him obſerv'd in Glaſs, *or* to conclude from them, that Ponderable parts of Flame will be able as well to paſs through the Pores of Metallin veſſels as thoſe of Glaſs.

Having given theſe Advertiſements, to prevent the drawing of unſafe conſequences from his Experiments, he ſubjoyns three or four *Corollaries* that may more warily be deduced from them. The *firſt* confirms, that Flame may act as a *Menſtruum*, and make Coalitions with the bodies it works on. The *ſecond* propoſeth a Paradox about *Calcination* and *Calces*. The *third* ſhews, that neither the *Epicurean* hypotheſis, ſuppoſing a penetration of the igneous particles through the Pores of the Glaſs; nor the *Carteſian* doctrine, teaching the operation of the fire to be perform'd by the vehement agitation of the ſmall parts of the glaſs, and by them propagated to the included bodies; that neither of theſe, *I ſay*, do ſeem to hit the mark. The *fourth*, That bodies very ſpirituous, fugitive and minute, may, by being aſſociated with congruous particles, though of quite an other nature, ſo change their former Qualities, as to be arreſted by a ſolid and ponderous body, to that degree as not to be driven away from it by a fire intenſe enough to melt and calcine metals.

Advertiſment.

The Reader is herewith deſired to take notice, that the next of theſe Tranſactions will not appear abroad till about the end of October *next.*

Errata left uncorrected in N°. 95.

Pag. 6060. l. 16. r. *Cerebellum.* Pag. 6062. l. 1. r. *within the.* Pag. 6068. l. 16. r. 12. *d.* Pag. 6069. l. 5. r. *Evolution.* Pag. 6070. l. 15. r. *he premiſeth.* Pag. 6071. l. 1. r. *and having.* *ibid.* l. 24. r. *Ricciolus.* Pag. 6074. l. 11. r. *Models.*

Errata in this *Numb.* 96.

Pag. 6081. l. 42. r. *propiores.* Pag. 6082. l. 13. r. *huic malo apparenti.* ibid. l. 37. r. *& relatum.* ibid. l. 44. r. *cùm Orthographicè*, pro, *Geographicè*. Pag. 6096. l. 1. r. *ſecundam.*

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